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COOKING TOUGH MEATS

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The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston.

Cultivated mind is the guardian genius of democracy. . . . It is the only dictator that freemen acknowledge and the only security that freemen desire.

Mirabeau B. Lamar.

COOKING TOUGH MEATS

In the October (1912) number of the "World's Work," in an article on "Beef," the following dialogue, pertinent to this question of tough meat cookery, occurs:

"That will be 72 cents," said the shop-keeper, handing me my bundle across the counter.

"Seventy-two cents," I gasped. "How much does that steak weigh?"

"Two and one-quarter pounds, 32 cents per pound," smiled the butcher. I begin to question, to unburden my mind on the subject of robbery and the beef trust, when a small child entered the shop.

"Mamma wants 10 cents worth of soup meat," said the child, "and won't you please cut it with the ham knife?"

Mr. D. sharpened his knife, obligingly trimmed a bone and cut off a chunk of beef which he then threw on the scale. Two and one-quarter pounds. The same as my porterhouse steak.

"There you are, little girl," said he, handing over the package, and she gave him the 10 cents in return.

"That's your answer," he said, turning to me. "She gets two and one-fourth pounds for 10 cents; you get two and one-fourth pounds for 72 cents. I've got to sell the tough cuts for that price or not sell them at all, and I can't get porterhouse steaks fast enough to supply the demand. Why, an hour ago your coachman's wife bought the same cut."

The interest here in this article is not why the porterhouse steak is so expensive, but, in the face of these given facts and conditions, how can the cheaper cuts of meat be made more palatable, and hence more largely used. Here in Texas the differences in price are not as great as those given above, but the tender cuts are at least twice as expensive. Even where the meat is not purchased but killed on the farm, it is a matter of great economy to know how to cook the tough pieces and make them appetizing and delicious.

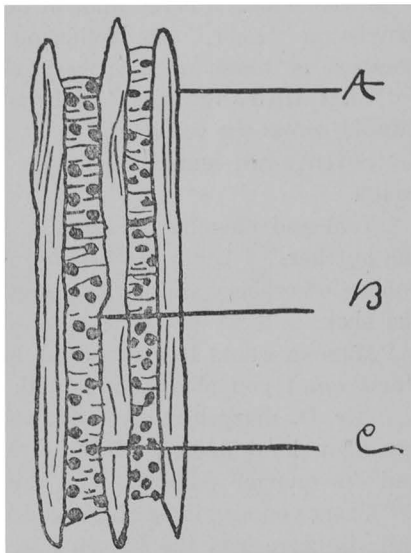
Meat, whether it be tough or tender, consists of muscle tissue. The lean or muscle tissue is made up of bundles which can be divided into smaller and smaller bundles until finally the division

brings a single fibre, which really is an irregularly shaped tube, but so small as to be invisible to the unaided eye.

MAGNIFIED GROUP OF FIBRES WITH CONNECTING TISSUE IS SHOWN IN ACCOMPANYING DIAGRAM.

Structure of meat:

- A. Muscle fibre.
- B. Connective tissue.
- C. Fat cells.



These muscle tubes have a distinct wall, are filled with a semi-fluid content, and are bound together in bundles by means of a threadlike substance, called connective tissue.

Now, whether meats are tough or tender depends on two things: the character of this muscle tube, and the character of the connective tissue, which binds the tube and the bundles of tubes together. In young and well nourished animals the tube walls are thin and delicate, and the connective tissue is small in amount, but as the animal grows older, or is made to work hard, the walls of the tubes and the connective tissues become thick and hard. This is the reason that the flesh of a young, well-fed animal is tender, and that of an old, hardworked animal is tough and requiring special care in cooking. The above, also in part, explains the presence of tough and tender meat in the same animal. The part of the animal which is exercised develops a thicker tube wall and stronger connective tissue.

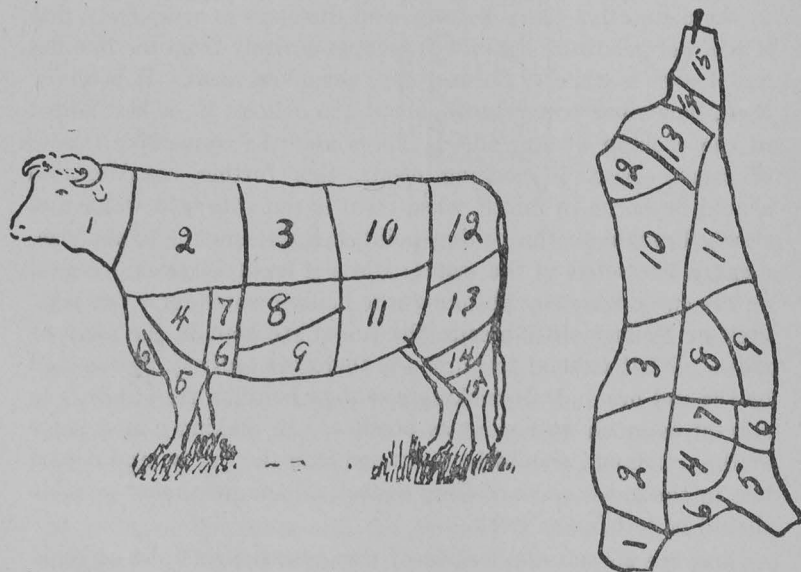
To cook any substance intelligently it is necessary to know

the kind of food stuffs with which one is dealing, and at what temperature that food stuff is best cooked to give the desired results. In the case of the meats we have in the muscle fibres substances somewhat resembling the white of an egg, while the connective tissue binding these fibres together is a substance similar to gelatin. If the white of an egg is subjected to high temperature, as high as the boiling temperature, we know that it toughens and shrinks. This is true of the substances found in the meat. A high temperature, or the boiling temperature, is therefore not the best suited to keep the meat juicy and tender. In the case of gelatin, we also know that a long-continued boiling temperature not only softens the gelatin, but also dissolves it to such an extent that it loses its power of again gelatinizing. Therefore, when the connective tissue of meat is boiled for a long time, or otherwise subjected to a high temperature, the gelatin in the connective tissue softens, and dissolves so completely that it will not gelatinize again. It escapes entirely from the bundles and leaves a stringy, fibrous, dry, shrunken mass. It is plain, then, that a low temperature, about 185 degrees F., is best suited to the cooking of the muscle fibres and the connective tissues of meat. Also, in cooking meats, this further consideration should be borne in mind: when meat is put into cold water and slowly brought to the boiling point, a large amount of nourishment is extracted in the water; while if meat is quickly seared on the cut surface, by plunging into boiling water for a few minutes, or by any other means, the juices are kept in the piece of meat. What method to pursue is therefore entirely determined by the end in mind. In making a soup or bouillon the object is to extract as much nutriment as possible. In making a stew some of the nutriment should be extracted into the gravy, and a part left in the meat; in parboiling a steak all the nutriment possible should be left in the steak.

Now, the special application of the general principles of cooking meats to the cooking of tough meats, when this gelatinous connective tissue is abundant and hard, and the muscle tubes are tough, is as follows: If a comparatively thin piece of meat (as steak) is used, slash or pound the cut surfaces to break up the tough fibres. If all the juices of the meat are to be retained, sear all the outer surface at once. If not, extract the juices by putting into cold water.

Cook the meat at a low temperature, below the boiling point, for a long period of time. Here the fireless cooker is an excellent means of cooking, as a temperature below the boiling point is maintained for a long time. Salt the meat at the end of cooking, as salt tends to harden the muscle tissues. If the meats are too tough to respond to the above treatment, add a small amount of vinegar or lemon juice to the water in which the meat is cooked, or soak the tough chop in lemon juice or vinegar for an hour. The acid acts upon the connective tissue and softens it. Meat may also be made more tender in another way. Protect the meat from spoiling by rubbing it with a mixture of salt and a little ginger and pepper, and keep in a cool place several days before cooking.

DIAGRAM SHOWING THE VARIOUS CUTS OF MEAT.



1 neck.

2 chuck.

3 ribs.

4 shoulder clod.

5 fore shank.

6 brisket.

7 cross ribs.

8 plate.

9 navel.

10 loin.

11 flank.

12 rump.

13 round.

14 second cut round.

15 hind shank.

When we study the accompanying diagram and consider how many of the muscles of the animal are used in walking, head movements, etc., we realize what a large part of the animal is offered for tough meat cookery. The neck piece, the shoulder-clod, the short-ribs, the brisket, the flank, the rump, the round, the shank, all are more or less tough, but juicy and nourishing, when cooked properly. The recipe given below will indicate ways of treating tough meats to make them tender and good.

In buying these tough meats, one should know the amount of fat and bone the particular cut carries in order to get the most nourishment for the least expenditure. For example, the chuck rib is about the same market price as the rump, but the rib is about 53 per cent waste while the rump is only 19 per cent waste, making the rump a cheaper meat. See table below based on Austin market prices December, 1915.

Cut of beef.	Proportion of waste.	Proportion of edible material.	Assumed price per lb.	Net price per lb. of edible part.
Brisket	23.3	76.7	12½	16
Rump	19.0	81.0	17½	20+
Flank	5.5	94.5	20	21
Porterhouse	12.7	87.3	20-25	23 to 28.
Neck	31.2	68.3	12½	17
Round	8.5	91.8	20	21+
Shin	38.3	61.7	6	8+
Chuck ribs	53.8	46.2	15	33

TO BROIL TOUGH STEAK.

Bottom Round or Flank Steak.

Take a round or flank steak of about one inch or more in thickness, wipe, trim and place on a clean paper. Slash the surfaces, taking care not to cut through, and with the edge of a kitchen plate work into each surface about one-fourth of a cup of flour. Heat a skillet, rub with a bit of fat, and brown the steak well on both sides. When the steak is brown, add a half cup of boiling water, cover the skillet with a close fitting lid, and push to the back of the stove to cook slowly until tender. (It should *not* boil.) This takes from 40 to 60 minutes. Season and serve with the gravy.

BEEF STEW.*Use the Brisket or Rump.*

Cut two pounds of stew meat into small cubes and put one-third into a greased skillet to brown. When well browned on all surfaces, add this to the remaining meat, cover with cold water and bring slowly to the boiling point. Boil for a few minutes and place at the back of the stove to cook slowly for three or four hours, or until tender. When the meat is tender and the water nearly evaporated, add about one cup of cooked string beans and one can of tomatoes which have had a part of the water evaporated from them. Season and serve. Potatoes may be added also.

BEEF LOAF WITH TOMATO SAUCE.*Chuck or Round Steak.*

Wipe clean three pounds of beef, chuck or round steak, removing skin and membrane. Run through meat chopper, or chop finely with a knife, add one-half pound of salt pork finely chopped, one-half cup of finely chopped bread crumbs, four tablespoons of cream, one-half cup milk, one egg beaten slightly, two tablespoons lemon juice, one tablespoon salt, one teaspoon pepper, and a few drops of onion juice. Pack in a bread pan, smooth evenly on top and bake two hours in a slow oven. Serve with tomato sauce made as follows: Cook one-half quart can of tomatoes a few minutes, then rub through a strainer. Rub together two tablespoons of butter and two tablespoons of flour; pour tomato on butter and flour and bring slowly to the boiling point, stirring to prevent scorching. Add one-half teaspoon of salt and one-eighth teaspoon of pepper. Turn beef on heated platter with sauce around it.

MOCK DUCK.*Chuck Steak or Bottom Round.*

Take a round or chuck steak, cut about one inch thick, place on clean paper, and wipe, trim and slash the upper surfaces. Make dressing of bread crusts, butter, salt, pepper and onion,

if desired, and spread on the surface of the meat. Roll up the steak and tie securely; then brown the exposed surface well, and cook on a hot plate in a fireless cooker or in the double boiler. If cooked in the fireless cooker, a small amount of water will need to be added to the steak, but no water is necessary in the double boiler. This takes about three hours to cook.

MUTTON STEW.

Neck Pieces of Mutton.

Cut two pounds of mutton into small pieces, cover with cold water, and bring to boil quickly. Boil a few minutes, and place on the back of the stove to cook slowly for several hours. Prepare about one-half cup of several vegetables cut into small pieces, as potatoes, carrots, onions, turnips, etc., and add to the stew in time to have the vegetables thoroughly cooked. When all is tender, thicken the gravy with flour and season with salt and pepper.

Stews may be made on the fireless cooker. Here we have an excellent means of cooking the meat at a low temperature.

CORN BEEF

Use a lean and solid piece of meat carved from the brisket or rump.

For cooking corn beef the fireless cooker is the best. Wash and boil the beef from 30 to 40 minutes on the fire in the stew pan. Place in the cooker and close tightly. Allow this to stand over night or about six hours. Remove from the cooker, and allow the beef that is to be served cold to cool in the water in which it is cooked.

Where one has no fireless cooker the beef can be kept at a slow cooking temperature at the back of the stove. Do not boil after the first 30 minutes as the beef becomes stringy and hard.

VEAL BIRDS.

Veal Steak from Foreleg.

Wipe, remove bone, trim and cut into pieces about 3 inches square, or smaller pieces, shaped as the muscular division of the

meat determines. Make a dressing of bread crumbs, salt and pepper, and spread on the veal. Roll this, and tie or pin with a tooth pick, roll these birds in egg and cracker, brown well in a small amount of fat, add 1 cup of boiling water, or 1 can of heated tomatoes, cover tightly and bake for 1 hour in a moderate oven or cook slowly on top of stove.

CHICKEN FRICASSE.

For a Tough Fowl.

Dress, clean, wash and cut up the fowl, and put in a cool place for several hours or longer. Before cooking cover the flesh with water to which one quart of sour milk has been added and allow it to soak for several hours (2 to 4). At the end of the time, pour away the water, cover the meat with boiling water, boil ten minutes, and push to back of stove to simmer slowly until tender (4 to 6 hours, depending on the toughness). When tender, place the chicken on a heated dish and pour over it a sauce made of four tablespoons of butter, four tablespoons of flour and 3 cups of the broth in which the chicken was cooked. Serve with boiled rice.

STEWED CHICKEN WITH NOODLES.

Stew the chicken as described in the above chicken fricasse; remove the chicken from the broth to a hot platter; cook the noodles in the broth and serve around the chicken.

TO MAKE NOODLES.

Beat two eggs lightly, add one-half teaspoon salt and stir and knead in as much flour as possible. Roll very thin on a board and allow to dry out. Roll and cut very fine.

When there are any left-over portions of the tough meat, they can be attractively used in made-over dishes, as:

COTTAGE PIE.

Cover the bottom of a buttered baking dish with mashed potato. Add a thick layer of finely chopped soup meat or meat left from stew, etc., season with salt, pepper, and onion juice, and moisten with some of the stock or gravy. Cover with mashed

potato. Bake until well heated through. Cooked rice or macaroni can be substituted for the potato.

MINCED MEAT WITH POACHED EGG.

Chop or grind the cold meat; heat with some of the gravy or stock, season with salt, pepper and onion juice or celery salt. Put meat on buttered toast and a poached egg on top of the meat and serve.

MEAT CROQUETTES.

- 3 tablespoons butter.
- 3 tablespoons flour.
- 1 cup milk or stock.
- 1 cup finely chopped meat (heated).
- $\frac{3}{4}$ teaspoonful salt.
- $\frac{1}{8}$ teaspoonful pepper.

Melt the butter, add flour and heated liquid. Bring to a boil and boil 3 minutes. Add meat and seasonings. Spread on a plate to cool. Shape, roll in crumbs, then in egg, and again in crumbs, and heat quickly in a hot oven or fry in deep fat. Serve with tomato sauce (given for beef loaf), or with cream sauce to which green peas have been added.

Oftentimes our so-called tender meats call for tough meat treatment because we have been ignorant, and allowed our butcher or his buyer to be ignorant of what really goes on in meat after it is killed. So he fails utterly to get his meat into condition before he sells it. He should know that after the slaughtering of the animal there are three distinct stages through which the meat passes. In the first stage, when the meat is just slaughtered, while the animal heat is still present, the flesh is soft and juicy, and probably tender. This is the condition of a chicken which is freshly killed, and cooked at once. This practice is thought by many to be very desirable, but by others to be disgusting. There is no definite knowledge and understanding on this point. In the next stage the meat stiffens and becomes hard and tough. This stage is called "rigor mortis," and continues several hours or several days, even, until the first changes of decomposition set in. Here we come to the third stage, where the muscles are relaxed, and the first changes of

decomposition begin, producing a lactic acid, which acts on the connective tissue to soften it, and make the meat more tender, just as the added vinegar or lemon juice does.

No meat should be sold in the second stage if tenderness is to be expected, and great care in warm climate must be used when the third stage is entered upon. On the farm, if all of the meat becomes ready for use at one time and there is danger of spoiling, the following method was used many years ago by the Indians and is practical for use today. Take medium sized pieces of meat, cook slowly in water until tender, adding the seasoning the last half hour of cooking, or if it be a leg of mutton or veal, or roast or cut into steaks or chops, cut into steaks and pan broil. Allow the meat to stand until cool. Then pack in a stone jar tightly, and put a few cloves on top, and pour over and through it melted beef suet or lard. When cool cover with a cloth and put in a cool place. Before using it, scrape off all the fat possible and plunge into boiling water to remove fat still remaining and use as is desired. Meat may be cooked as directed above, chopped, seasoned well, packed tightly in a jar, the top covered with melted suet, and, when needed, cut into slices and served as cold beef loaf.

If the predictions of John Clay, who was at one time a ranch manager in Texas and is now one of the best known cattle shippers in the United States, are to be relied upon, the cooking of tough meats should be further investigated, and certainly the tough meat more widely used. He states that every year there are more people eating meat and fewer producing it, and that 30 cents and 40 cents per pound will be charged for tender cuts within the next thirty years with no possible way of reducing the cost, unless some one discovers a breed of animals producing altogether tender meats.

